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The history & present conditions of the oil...

[London]

1921

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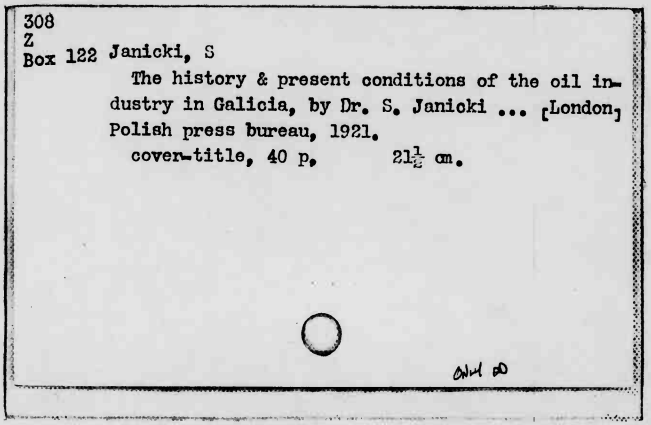

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THE HISTORY & PRESENT CONDITIONS OF THE OIL INDUSTRY IN GALICIA.

BY

Dr. S. JANICKI.

Price, 2/6 Net.

POLISH PRESS BUREAU,
2, UPPER MONTAGUE STREET,
RUSSELL SQUARE, W.C.1.
1921.

M.W.i.H. Ausg. 2, 23

The History and Present Conditions of the Oil Industry in Galicia.

By Dr. S. JANICKI.

FOREWORD.

PETROLEUM occupies a chief place among the natural riches of Poland.

Galician petroleum, as the oil world is now aware, constitutes a very important factor in the world's market. To-day, when petroleum occupies such a leading position in commerce, and is so essential for the needs of communication and national defence, it is natural that any fresh field should become a source of contention between the two competing blocks which have dominated the industry in recent years. The fact of this struggle has at any rate given considerable importance to Galician oil, as was shown by its first fight with the Standard Oil Company in the first decade of the present century.

There can be no doubt that the petroleum of Galicia is of special importance to Poland, inasmuch as it is one of those products of unusual consumption which, fortunately for herself, Poland is in a position to supply at once to other nations on advantageous terms. Besides, the export of petroleum formed the basis of all the existing international agreements of the new State, whether with Austria, Czecho-Slovakia, Germany, or Hungary. As this industry had attained abnormal conditions of development under the Austrian Government, to-day it requires the help of foreign capital for the exploitation of those immense petroleum fields which have not yet been explored or bored, for the deepening of the existing petroleum-bearing fields, and for the establishment of refineries and a more efficient trade in the different products of oil.

HISTORY.

The existence of rock-oil in the Carpathians was known hundreds of years ago, but no special attention was paid to it. In the sixteenth century, however, a royal charter was granted to the town of Krosno, giving it the right to use flax oil with a mixture of mineral oil for lighting the town, for lubrication and for the preparation of hides. This rock-oil was in all probability procured from Wietrzno and Węglówka.

In 1778 the peasants at Sloboda Rungurska used this substance as cart grease and as medicine for animals with skin disease, and at Wietrzno it was used as a remedy for sheep disease. In the seventeenth and eighteenth centuries, therefore, rock-oil was known to Polish naturalists as pitch, mineral tar or rock-oil, chiefly in the Ruthenian Carpathians. Professor Balthazar Hacquet refers to rock-oil being used for the above purposes in 1794, and speaks of wells of this liquid at Węglówka, near Krosno, at Kwaszenin and Nahujowice, in the neighbourhood of Drohobycz. The Austrian State reckoned mineral oil among the Government reserve minerals, but nothing further was done.

The oil industry at that time was extremely primitive; its origin dates from 1810-17, when a mining company for the exploitation of mineral oil was founded at Drohobycz by Jan Mitis and Jósef Hecker, surveyor of salt mines at Drohobycz. They were also the first to carry out the process of distilling lighting oil from rock-oil. In 1817 the civil authorities at Prague ordered 300 quintals of oil from this firm at 34 gold guldens per quintal, for lighting the streets. Difficulties of communication and delay in delivery soon brought this enterprise to an end and the first attempt at distillation sank into oblivion.

The middle of the nineteenth century saw the beginning of the large oil industry when, about 1852, Ignacy Łukasiewicz, a dispensing chemist employed by Mikolasch at Lwów, and his colleague Jan Zeh, following the hints of a certain Boryslaw Jew, succeeded after many experiments in obtaining a better rock-oil distillate than that previously

used in lamps, and from that moment the development of the oil industry made rapid progress.*

THE GEOLOGY OF POLISH OIL MINES.

The oil deposits in Galicia are connected with the flexural strata running along the Polish Carpathians beyond the Tatra, Pienina and Czarnohora groups in the east.

The flexural Carpathians are formed of a number of saddles and troughs running more or less parallel to each other. They are composed of chalk, Eocene and Oligocene strata, and oil is to be met with in each of these formations.

The width of our oil zones depends on the dip of the strata and varies from 200 to 500 metres; 300 metres may be taken as the average. The productivity of the different territories varies. It has been calculated that the average productivity of one bore-hole in the mine at Potok amounted to 400 wagons, and this can be taken as the average of all the mines in the Eocene strata.

The number of oil zones in the Polish Carpathians has not yet been established. We mention below the most important already in operation or on the point of being exploited. Starting from the west we meet with the following :—

	Length in kms.
Mordarka-Klęczany-Marcinkowice ..	18
Librantowa-Strzylawka	15
Ropa-Łosie	3.5
Lipnica-Jankowa-Szalowa	10.5
Szymbark, Siary-Sękowa-Ropica ..	12
Kobylanka-Libusza-Harklowa	16
Biecz-Głęboka	6
Cieklin-Mrukowa	8.5
Zmigród Dukla	12
Zboiska-Klimkówka-Wola-Sękowa ..	34
Łężyny-Bóbrka-Iwonicz	31
Bartne-Swierzowa	9
Sądkowa-Potok-Krościenko-Trześniów ..	35
Węglówka-Krasna	16
Brzyski-Bezdziedza	9
Jabłonica-Zmiennica-Turzepole	12
Blizne-Grabownica-Bykowce-Monasterzec	45
Nowosielce-Plowce-Zagórz	20

* "Galicyjski Przemysł Naftowy," by Dr. L. Rymar, Cracow, 1915.

	Length in kms.
Ropianka-Barwinek	12
Krzemienna-Witrylów	14
Tyrawa Solna-Ropienka-Jawora ..	80
Polana-Chrewt	10
Rajskie	7
Mokre	7
Morochów	8
Strzelbice	12
Rudawka-Rosochy	9
Pohar-Pławie	15
Urycz-Schodnica-Opaka	14
Rypne-Duba	9
Perehinsko	8
Dolina	10
Starunia-Mołotków	10
Sloboda Rungurska	8
Kosmacz	10
Pasieczna-Bitków	15
Jabłonica-Żabie	27
	557.5

In round numbers, 550 kilometres of oil zones.

Taking the average width as 300 metres, we have a superficial area of 16,500 hectares of oil-bearing ground. Reckoning one bore-hole producing 500 cisterns to each hectare, the store of oil in this area amounts to 8,250,000 wagons of 10,000 kilogrammes.*

PRODUCTION.

The cradle of the Galician industry is at Bóbrka, the property of Karol Klobassa, where springs of running water were discovered to which the people attributed miraculous healing powers in certain diseases. In 1854 Łukasiewicz and Trzecieski began digging wells in the neighbourhood of these springs, from which subsequently oil was extracted. The first of these wells was called "Wojciech" and was quickly followed by others. This was the elementary school of the type of Galician oil miner so sought after to-day.

The introduction of a slowly sinking drill for deepening the wells in imitation of America was the first step forward in mining technique. At Bóbrka, in 1862, with the help of this drill it was possible

* "Górnictwo Naftowe w Polsce." by Dr. J. Grzybowski, Warsaw, 1919.

for the first time to reach a much greater depth without risk to human life. The introduction of the Canadian boring system in 1884 greatly contributed to the rapid development of mining science in Galicia. And to-day, if the Galician oil industry is a world industry, it is not solely on account of the output, but also on account of the highly developed boring technique which accomplishes such wonderful work. One of the main causes of this development is the great skill of the Galician workmen, which makes them in demand all over the world, especially where the oil industry is in its infancy.

With the spread of the Canadian system and its improvement new oil zones were opened up, thanks chiefly to St. Szczepanowski. The first of these was at Sloboda Rungurska in Eastern Galicia, then at Schodnica, with its abundant sources of oil; in 1897 at Borysław, thanks to the Carpathian Oil Company, and, finally, at Tustanowice. This example was soon followed in Western Galicia. In 1880 rock oil was found in the Krosno oil zone as near the surface as 70 metres, for instance at Bergheim and Węglówka. Later on pure and abundant oil was discovered at Potok, and still later in Schodnica. Without further delay the work of sinking the shafts in the western oil zones was begun and such brilliant results were obtained by initial work at Rogi that to-day it is difficult to predict the future of this zone notwithstanding the decrease in boring operations.*

Oil output attained its zenith in 1909 with 2,076,740 tons, a figure reached by no other country except the United States, Russia and Mexico. Up till 1912 Galicia had produced a total amount of 16,525,184 tons, or 500,000 tons more than the Dutch East Indies. Up to the outbreak of war no country, with the exception of the United States, Russia and Mexico, had produced as much rock oil as Galicia, although from 1910 production began to diminish at an average rate of 300,000 tons per annum. The cause of this was partly the exhaustion of some rich sources and partly the reduction in boring operations occasioned by abnormal conditions of production—*want of reservoirs, pipe lines and railway cisterns, and also insufficient investigation of the oil zones.*

* Dr. L. Rymar, *op. cit.*

In 1911 the oil reservoirs in Galicia had a total capacity of 264,755 cisterns, of which :—

151,798 were private property.
86,582 were Government property.
26,375 were leased by the Government.

These reservoirs were never sufficiently capacious to contain the entire output, and the excess oil was consequently produced in vain. This was harmful to production and *set a limit to boring operations.* The want of cisterns is attributable to the Austrian-Government, which failed to come to the assistance of producers in need of capital. The oil refineries incorporated in the " Petrolea " Company promoted the building of the reservoirs, and it was in their interest not to build them too large, as they could then acquire the excess output at a low price. *The want of reservoirs exposed the Galician oil industry to severe losses and to enormous waste of precious raw material,* for, in 1907 and 1908, oil wells like the " Wilno " at Tustanowice and the " Oil City " were producing 100 wagons a day, and, the storage capacity being inadequate to cope with this amount, the meadows and fields for miles around were flooded with oil. Such uneconomic administration not only rendered a quantity of oil worthless, but reduced the value of less productive oil zones.

The history of the production of rock oil in Galicia is one continual struggle for credit, storage room and a remunerative price which the refineries were determined to keep low. The home refineries, and still more the Austrian and Hungarian refineries, played an inglorious part in the development of the production of Galician rock oil, and are answerable for the fact that that industry is not as flourishing as it should be. The refineries were opposed to every organisation of producers to raise the price of rock oil. They were opposed to the establishment of new refineries and reservoirs, which would lead to competition and the reduction of the quantity of rock oil on the market. They exported any excess supply of rock oil at a purely nominal price. Keeping up the high price of refined oil in the country, lowering the price to foreign countries, and deriving large profits from the value of their oil refuse, they exported the refined oil and at the same time

redeemed their invested capital at the cost of home production. In this way the activities of the refineries had a baneful influence on the production of oil in Galicia.

The productivity of the oil zones in Eastern Galicia, which created a boom at the end of the nineteenth century, decreased just at the time when the total output in Galicia increased from 500,000 tons in 1902 to 2,000,000 tons in 1909, the increase occurring in Western Galicia—the cradle of the oil industry, and from which much is expected, for, although deep drilling is necessary, *a steady and valuable supply is ensured.*

Up to the end of 1919 Polish wells produced a sum total of 22,520,600 tons of crude oil.

The following table gives the output of rock oil in Galicia for the last 21 years :—

Date.	Output (in tons).	Value (in crowns).	Workmen employed.
1900 ..	347,213	21,113,577	5,906
1901 ..	404,662	23,010,589	5,787
1902 ..	520,847	14,676,651	5,889
1903 ..	672,508	17,101,312	5,107
1904 ..	823,943	24,405,822	6,271
1905 ..	794,391	19,587,433	6,650
1906 ..	737,104	19,843,685	6,446
1907 ..	1,125,806	24,938,473	5,930
1908 ..	1,718,030	20,570,784	5,393
1909 ..	2,086,340	32,221,494	5,048
1910 ..	1,677,976	44,068,490	5,499
1911 ..	1,487,842	46,994,393	6,342
1912 ..	1,144,133	57,234,546	5,703
1913 ..	1,113,668	85,741,538	7,258
1914 ..	655,614	46,149,325	—
1915 ..	676,942	72,488,976	—
1916 ..	927,440	186,286,057	—
1917 ..	901,910	271,575,047	—
1918 ..	822,940	—	—
1919 ..	831,703	—	—
1920 ..	764,818	—	—

The production of rock oil in the different districts of Galicia in 1913 amounted to :—

District.	Enterprises.	Workmen employed.	Output in Tons.	Value (in crowns).
Jaslo ..	73	1,439	66,905	5,489,032
Drohobycz	334	5,067	1,004,290	76,310,201
Stanislawów	37	752	42,473	3,942,305
Total ..	444	7,258	1,113,668	85,741,538

The production of rock oil in some places is shown in the following table:—

Output in Schodnica.		Output in Borysław and Tustanowice.			
	Tons.		Borysław.	Tustanowice.	Tons.
1904	72,620	1904			546,010
1905	60,200	1905			546,550
1906	47,150	1906			562,190
1907	39,650	1907			1,011,590
1908	36,480		Tons.	Tons.	
1909	34,860	1908	266,910	1,318,710	
1910	32,800	1909	231,190	1,706,430	
1911	39,460	1910	209,300	1,404,320	
1912	32,170	1911	197,320	1,105,420	
1913	29,560	1912	170,500	856,440	
1920	22,950	1913	195,980	696,140	
		1914	192,800	545,200	
Mraznica I.		1915	240,810	369,290	
	Tons.	1916	289,580	489,120	
1920	109,560	1920	270,590	245,420	

The future of Galician production depends on sensible and well-directed preliminary work: investigation of new oil zones, experimental boring, and a methodical system of boring operations and production. It does not do to overrate the present fall in output due in a great measure to abnormal conditions of production which a business-like system of exploitation will cause to disappear. A similar fall in output has happened before now in other countries—in the Dutch East Indies in 1899, 1905, 1908 and 1912; in India in 1910, and in Russia in 1901. It is impossible to foretell the fate of the Galician oil industry during the next few years. It is possible that the output may still fall owing to the exhaustion of the chief sources of supply—Tustanowice. On the other hand, boring operations are being steadily carried out with generally favourable results. Dobrohostów, Bitków, Starnina, Dźwiniacz, Manów and Pniów are all new oil zones which give rise to hopes that they will help to raise the level of production.

GAS OIL.

Galicia is also blessed with a great wealth of oil gas. Although the production of this gas is not managed on sufficiently economic lines owing to the want of pipelines, of which there were scarcely 127,000 metres in 1909, the Tustanowice and Borysław district alone could supply 525,000,000 m^3 of gas equal to 50,000 wagons of rock oil and worth £1,000,000.

Gas oil is especially abundant in the Krosno district.

The gaseous territory in the Krosno basin is characterised by the peculiarity that the gas is not directly obtained with the oil, at least, oil is not met with at the depth from which the gas is extracted—about 800 metres. The primary object in boring these shafts was to obtain oil, but the discovery of such an abundance of dry gas gave rise to the idea of utilising this unexpected treasure, and deeper boring was abandoned.

The gaseous territory in the Krosno district has not yet been thoroughly explored, but geologists argue, on the basis of present borings and investigations, that it extends to a length of 6 kilometres and a width of about ½ a kilometre. This area could comprise about 200 shafts constructed at a distance of 120 metres, so that one shaft should not deprive the other of oil, and so that the exploitation might be carried out on economic lines.

This territory is producing to-day upwards of 400 m^3 of gas per minute from five shafts, the most productive of which is Waterkeyn's "Vulkan II.," with 245 m^3 per minute; "Vulkan I.," belonging to the same firm, 40 m^3; "Gisem," Gartenberg firm, 53.5 m^3; "Malgorzata," a Hanover Association, 65 m^3; and finally, "Olga," belonging to the same company, 4 m^3 per minute. Four new shafts are in course of boring operations, and four are actually being mounted. All these data, above all the relative high productivity of each shaft and the long duration of that productivity (some shafts having been in efficient operation for 10 years), justify the supposition that a wealth of gaseous fuel material to the value of many millions is buried in this ground. *

OZOKERITE.

Besides crude and gas oil, Galicia has great deposits of natural petroleum wax or ozokerite.

Ozokerite is to be found in Miocene salt clay strata like those at Borysław and Truskawiec. This petroleum wax is sometimes in strata of only a few centimetres, but these strata sometimes attain a depth of 30 metres. As the superposed strata are not of very solid construction, mining operations are easy, and are carried out in the Drohobycz and Stanisławów districts. In 1913 there were 28 shafts in operation. The ozokerite obtained from these was melted on the spot and delivered to the kerosene and paraffin factories. In 1913 686 tons were dispatched to Germany, Russia, America and Switzerland, while 659 tons were worked up in the country.

* "Oil Gas in Galicia," by Dr. S. Bartoszewicz, POLISH ECONOMIC BULLETIN, No. 8, 1920.

The output of ozokerite from 1900 to 1913 was as follows :—

Date.	Output (in tons).	Value (in crowns).	Workmen employed.
1900	2,004	1,585,777	2,229
1901	2,707	2,572,448	2,660
1902	2,655	2,922,362	2,610
1903	2,849	4,350,193	3,006
1904	3,086	4,730,554	2,999
1905	2,957	4,131,566	2,888
1906	2,698	3,352,363	2,258
1907	2,508	3,117,100	2,352
1908	2,593	3,240,855	1,854
1909	2,115	2,706,791	1,398
1910	2,171	2,923,569	1,313
1911	1,940	2,614,472	1,150
1912	1,683	2,460,690	968
1913	1,353	2,385,466	907
1914	810	—	—
1915	59	—	—
1916	246	—	—

The output of ozokerite in February, 1921, was 20.5 tons, and in March, 1921, 20 tons. Ozokerite in store amounts to 102 tons.

The oil industry in Galicia has passed through a crisis caused by overproduction brought about :—

(1) By lack of adequate storage of crude oil ;

(2) By insufficient refinery of crude oil ;

(3) By insufficient export possibilities ;

(4) By not using oil fuel on the State railways, etc.;

(5) By divided production amongst very small producers living from day to day ;

(6) By an excess of sellers and their competitors, aggravated still more by the existence of many shareholders and other people called "bruttowcy "* all having shares in the output of crude oil, and thus increasing the numbers of independent dealers in oil ;

(7) By competition between producers and refiners.

* These "bruttowcy" are people who owned the petroliferous land, and who sold it to the present owners or to owners who preceded them, and who reserved to themselves by agreement a certain part of the gross output of crude oil. (Brutto = gross output.)

REFINERIES.

The first oil refinery in Galicia was founded at Ulaszowice, near Jasło, in 1856 by J. Łukasiewicz, inventor of a refining process, and T. Trzecieski, and when this refinery was removed to Polanka a profit of 100,000 gulden (£8,000) was made during the first working year, the total profit made during the 10 years of its existence amounting to 1,500,000 guldens (£120,000). The oil produced was greatly in demand at Berlin and Vienna. Łukasiewicz moved the refinery from Polanka to Chorowka, and it was purchased by W. Stawiarski, who transferred it to Krosno, where it remains to this day, and is the oldest refinery in existence.

Galicia, therefore, precedes America and Russia in the oil-refining field, although the many improvements in it are due to America, as economic conditions in Galicia were not flourishing enough to admit of experiments being made. All these modern improvements were introduced later on by St. Szczepanowski in the refinery founded by him at Peczeniżyn in 1887.

The refining industry in Galicia was for the first few years concentrated in the Gorlice and Krosno districts, and then extended to Eastern Galicia in the neighbourhood of Sloboda Rungurska. In 1884, there were 57 refineries in Galicia, to-day there are 67—46 in the Drohobycz district, 11 in the Stanisławów district and 10 in the Jasło district. There are 16 large refineries and 51 smaller ones, working up from 400 to 6,000 wagons of rock oil. All of the latter and several of the larger ones are owned by Polish capital, but most of the large ones have been recently established with the help of foreign capital, and one is a Government establishment.

About the year 1890 the refineries passed through troublous times owing to the competition of the Austrian and Hungarian refineries, aggravated by the fact that what was supposed to be Russian rock-oil, which, as everyone knows, is of very poor quality, was really partly refined rock-oil, containing 90 per cent. of oil. Galician raw material, containing only 50 per cent. of oil, could not possibly

compete with this. It was only on the enormous increase of output in 1900, and the consequent fall in price, that the Austrian refineries began to work up Galician oil. The Austrian Government, instead of encouraging the refining industry at the rock-oil sources in Galicia, did everything possible to repress it there and to develop it in Austria by granting concessions in the latter country and refusing them in Galicia, and by introducing a lower import tariff for the raw material than for refined products, so that up till 1909 the Austrian refineries worked up nearly the entire output of Galician rock-oil. The fault of the relatively feeble development of the refining industry in Galicia must not be laid on the shoulders of the Poles. In spite of all difficulties, this industry began to develop fairly well during recent years. Large refineries have been established, and the number of small and medium-sized ones has increased, and just before the war the Galician oil-refining industry had taken its place in the fore-front. From 1902 Galicia was in a position to satisfy all the requirements of the Austrian Empire, and was obliged to seek foreign markets for the sale of its surplus oil products, as the taxes in force prevented any increase in home consumption.

Poland produces two types of crude oil, one of which is produced at Borysław and Tustanowice (standard type), the average analysis of which gives :—

About 35 per cent. petroleum.
,, 21 per cent. lubricating oils.
,, 10 per cent. motor spirit.
,, 10 per cent gas oil.
,, 6 per cent. paraffin wax.
,, 6 per cent. residues (asphalt, coke tar, etc.).

Besides the standard type mentioned, a special type is obtained which possesses no paraffin wax, but, on the other hand, contains a greater percentage of motor spirit. The average analysis of this special type is as follows :—

About 43 per cent. petroleum.
,, 20 per cent. motor spirit.
,, 15 per cent. lubricating oils.
,, 10 per cent. gas oil.
,, 20 per cent. residues.

The loss in the process of refining amounts to about 12 per cent. for the standard type, and about 10 per cent. for special type. Of the total oil production in Galicia about 80 per cent. is of the standard type, and the rest (20 per cent.) of the special type.

The refineries turned their attention in the first place to petroleum as the most abundant product of Galician rock-oil, then to lubricating and other oils, and finally to motor spirit and refined paraffin.

All the refineries in the Austro-Hungarian Empire together worked up :—

	Tons.	Galician Refineries.
1905	662,730	33.7%
1906	831,250	25.8%
1907	977,160	28.8%
1908	1,266,560	30.56%
1909	1,628,360	35.08%
1910	1,438,960	49.69%
1911	1,565,580	46.80%
1912	1,754,770	51.00%
1913	1,768,850	—
	Galician refineries only.	
1920	668,650	—

The Austrian refineries took the first place, for reasons given above, until the construction of a Government distillery at Drohobycz turned the balance in favour of Galicia.

The following table gives the total production of petroleum in Galicia from 1900 to 1912 :—

	For Home Consumption.	For Export.
	Tons.	Tons.
1900	219,170	4,220
1901	233,700	9,450
1902	243,300	30,930
1903	251,100	51,980
1904	246,100	91,500
1905	246,800	160,220
1906	247,200	170,820
1907	248,300	141,570
1908	250,000	234,160
1909	288,680	290,910
1910	300,130	266,730
1911	315,860	220,490
1912	317,140	—

In 1920, 178,880 tons of petroleum were produced, of which 86,150 tons were consumed in the country, and 58,350 tons were exported.

As a result of the diminution of rock-oil in Russia, the producers organised themselves and made themselves independent of the refiners, whose situation was aggravated by the erection of two refineries in the Austro-Hungarian Empire by the Vacuum Oil Company—a branch of the Standard Oil Company. These refineries beat up the prices of rock-oil and reduced the prices of refined products, cut down the existence of Austrian refineries, and raised the position of the producers. But when the production increased perceptibly in 1908 and 1909, and the refiners would not come to an understanding with the producers, the latter entered into an agreement with the Vacuum Oil Company. These negotiations brought about better relations between the producers and the refiners, and so the danger of a trust was banished.

Still, the old feeling of emulation between the producers and the refiners continues to exist at the present day. The National Petroleum Company (Krajowe Towarzystwo Naftowe), representing the producers, endeavoured to bring rock-oil to a high price, thus lending encouragement to production, and opposed the abolition of all State control. It was also unfavourable to the selling of the State refinery at Drohobycz to the French on condition that they put capital into it up to 40 per cent., because of the fear it should strengthen the situation of other French refineries to the detriment of the producers. On the other hand, the Society of Polish Producers and Refiners of Mineral Oils, representing the refiners, is opposed to all interference of the State, hoping by freeing itself of official interference to raise the price of oil products and lower the price of rock-oil. These are the results of separating the production, refining, and marketing of petroleum—this unfortunate inheritance from the times of the Austrians, and which could only be eliminated by the help of large capitals for producing and refining rock-oil.

CONSUMPTION.

The home consumption of Galician oil, that is to say the consumption within the frontiers of the

Austro-Hungarian Empire, was very small, amounting in 1911 to 6.2 kg. per head of population, whereas the normal consumption in other civilised countries amounted in the same year to 8.13 kg. per head, and in the United States even to 29.4 kg. The cause of such low consumption accompanied by such high exports of this commodity was the high consumption tax imposed by the Austrian Financial Minister on oil, which amounted to 13 crowns per 100 kg., while gas and electricity were untaxed. The insignificant consumption of oil in the country obliged producers to export a great part of their products, making them dependent on foreign competition, and undermining the foundations of the industry.

The home consumption of petroleum is given above. In 1912 it was 317,140 tons only.

The egoistic policy of the refiners, who only looked after their own profits, also contributed to the small increase in consumption.

The home consumption of other oil products was in 1912 as follows :—

	Tons.
Motor spirit	60,000
Paraffin wax	16,000
Lubricating oil	84,000
Gas oil	80,000
Mazut	45,000
Coke	43,000
Total	328,000

Together with petroleum the home consumption amounted in 1912 to 645,140 tons.*

EXPORT OF OIL AND OIL PRODUCTS.

As late as 1893 Austria-Hungary imported 1,470,614 metric quintals of crude oil. From that time, however, the import diminished, and when, in 1903, the output of rock-oil in Galicia amounted to 2,000,000 metric quintals over and above the demand, the country began to export.

* "Stan Ekonomiczny Malopolski," by Leon W. Biegeleisen, Warsaw, 1921.

A close examination of the pre-war exports of rock-oil and of oil products of Galicia is impossible. But by taking into account the importation of crude oil to Austria, we can indirectly arrive at some figures. The import of foreign crude oil to Austria amounted in 1912 to 17,870 tons, which was the lowest figure reached, and thus we can quite fairly conclude that all the petroleum that was exported was Galician. In coming to this conclusion we see that the total pre-war export by land and by sea amounted to many thousands of metric quintals, as the following table shows :—

	1904.	1905.	1906.	1907.	1908.	1909.	1910.	1911.	1912.
Petroleum	915	1,602	1,708	1,416	2,342	2,909	2,667	2,205	3,366
Motor spirit	137	81	151	226	256	325	393	419	687
Lubricating oils	309	378	588	632	1,111	1,309	1,391	1,355	2,018
Paraffin wax, raw and refined	60	90	108	147	286	380	444	379	517
Crude oil and Mazut	—	—	—	82	62	516	65	10	19

In 1912, export of petroleum to different foreign countries was as follows :—

	Metric Quintals.
Germany	1,982,000
Hamburg	337,000
France	500,000
Switzerland	301,000
Holland	84,000
Italy	66,000
Belgium	13,000
Turkey (Europ.)	10,000
Sweden	13,000
Denmark	7,500
England	67,000
English Possessions	4,000

Before the war the most important customers for Galician petroleum were the Germans, not to speak of those countries which formerly constituted the Austro-Hungarian Empire, such as Czecho-Slovakia, Austria, Hungary and Jugo-Slavia, which as we may remember, imported and refined half the petroleum of Galicia.

The consumption of Galician petroleum in Belgium, Denmark and Holland was somewhat higher than stated, for the petroleum exported to Hamburg was later re-exported to these countries.

The export of lubricating oil, heavy as well as light, increased steadily before the war. In that respect the Germans received the largest supplies,

and afterwards came the Italians, Swiss, Swedes, Belgians, Danes, English, Bulgarians, Turks, Egyptians, Algerians and Brazilians.

These articles might have found a splendid market in this country, not excluding gas-oil and paraffin wax.

The value of the export of gas-oil amounted to £500,000 in 1912, and of paraffin wax to nearly £1,000,000. The principal receivers of these articles were Germany, then Italy, France, Russia, United States of America, China, Japan, India, Chili, Mexico, Australia.

The value of the export of motor spirit amounted to over £500,000 in 1912; that export went to Germany, France, Switzerland, Italy and Denmark.

The best market for Galician petroleum and its products was the German. This market is so colossal that the Standard Oil Company did everything in order to capture it. This was prevented, to a certain degree, by the Russian, Galician and Roumanian oil companies. Since Russia's output diminished, Galician petroleum has successfully overcome the American Trust, in spite of reckless competition. This is an exceedingly interesting chapter in the history of Galician oil.

In order to remove the competition of petroleum importers, the Standard Oil Company lowered the prices, and in order to control the wholesale merchants, it exacted special contracts from them by which they bound themselves not to sell the products to other refineries. In order further to crush the competition of retailers, the American Trust opened their own shops in the neighbourhood. Yet all was of no avail. With the support of the German authorities, the existing refineries retained the upper hand. The imports of Galician oil increased while the American imports decreased. So it came about that in the year 1897 the relations of the former to the latter were roughly 1 to 95.52, and in 1910 they were 12.60 to 79.80. The import of Russian petroleum was 3.50 per cent., and Roumanian 4.3 per cent. At the same time Galician oil ousted Russian oil from the German market.

In 1902 the import of Russian petroleum to Germany was 14.75 per cent.; but the import of the same article in 1910 was only 3.50 per cent.

This fact plainly shows the vitality of the Galician oil industry, and it affords the best proof of the

falsity of the statement spread by its competitors of the helplessness of the Galician men of business, and of the bad quality of Galician oil. To-day, when the Polish State lends assistance in the production of her petroleum, the petroleum producers might easily make the most of the resulting commercial situation. All that is really indispensable is the influx of fresh capital for increased production. Only such an increase in the output of petroleum, and consequently an increase in the number of boreholes, can restore Galician petroleum once more to its former position in the markets of the world.

It remains to be seen whether the German market, which, in spite of such a strong opponent as the Standard Oil Company, was conquered by the Galician petroleum before the war, could not be replaced by other markets, above all, by the French and English markets. Negotiations with France show that she acknowledges the great importance of Galician oil on the world's market. On the one hand, the influx of petroleum and of oil products to the French market, together with a corresponding organisation of its output and transport services, might compete successfully with the Trusts, and keep the prices of these products on a low level; on the other hand, it might supply the French refineries with cheap material, and, while depriving the Germans of the influx of Galician petroleum, weaken their military and economic power.

The plain inference emerges that it would be greatly to England's advantage if she were to take more interest in Galician petroleum than she has done up to the present. Its possibilities are certainly enormous. The industry possesses great quantities of territory rich in petroleum, all modern appliances and excellent workmen. All that is required is new capital and a better organisation of transport.

CAPITAL.

The Galician oil industry owes its position to the small capitalists of Galicia. As, according to law, the petroleum belonged to the owner of the ground, large capital alone could face the task of exploiting it on a large scale. However, where the oil did not lie deep, and therefore the cost of reaching it would

not be great, small owners began to produce the oil. In this way, there was great activity during the first years of the existence of the petroleum industry, and the activity increased in proportion to the abundance of oil discovered on the Borysław-Tustanowice grounds. Generally, the establishments consisted of one to two shafts.

From 1886 to 1900 there existed firms which employed but very few workmen, and it was quite the exception if a company employed as many as 50. After 1910 one establishment occupied on an average 15 to 20 workmen. The actual change took place in the year 1908. From that time there was manifest a concentration of the industry in the hands of shareholders with a large capital. As the boreholes were drilled to a great depth, the pre-war cost was from £10,000 to £20,000 a shaft, and consequently the production demanded a larger outlay of capital. However, the existence of small capital restrained the normal development of the oil industry, favoured unwholesome speculation on the Stock Exchange, and exposed Galician and foreign investors to losses, which naturally contributed to bringing this industry into disrepute abroad. However, the appearance of the concentration of capital brought about a change.

Dr. Rymar* characterises the participation of foreign capital in Galician industry in the following terms :—

"Practically from the beginning of the industry foreign capital has played a great part in it, especially Viennese, then came Belgian, Dutch and French capital, but not in large amounts ; it is only during the last ten years that there has been much German and English capital. The influx of this capital raised its importance in the world's market. The uses of oil products steadily multiplied, and it is especially the use of oil for fuel, not only in the English Navy, but also in the French and that of other States, that has attracted the attention of capitalists, particularly French and German, to petroleum centres. They began to invest capital in Russia, Roumania and at length in Galicia.

* "Galicyjski Przemysł Naftowy" (Galician Oil Industry), by Leon Rymar, Kraków, 1915, p.115 ff.—This book is indispensable to anyone who would have a complete insight into the oil industry in Galicia.

"Since 1909 active measures have been taken by collecting capital by way of subscriptions. The appearance of English capital alarmed the Viennese capitalists. The news spread about that the English were trying to ruin the industry, that behind them stood the Standard, though none of these rumours had any foundation in fact. There was much regret that such a good field of operations for the Viennese banks as Galicia was should pass away from their hands.

"The English took up work in a methodical fashion, and although they were strangers in the country, they showed that they did not think of ruining the organised work already in progress, but on the contrary, would help it on with their influence. They began by buying mines which the *entrepreneurs* of the country got rid of in the firm conviction that they were nearly exhausted. The work progressed and they began to amalgamate their purchased companies into one body so as to increase the yield of the capital invested. In this way there continually emerged new combinations, the issue of shares and new subscriptions, and oil industry is very well adapted to that kind of financial operations."

English capital subscribed in Galicia amounts to £3,760,000 sterling.

German capital found its way to Galicia earlier. It certainly amounts to some tens of millions of crowns. In opposition to the English capital which was used for the working of the mines, the German capital began to acquire refineries, storage companies and pipelines. Through the fusion of this capital there arose a strong Anglo-German concern, commanding a capital of about 100,000,000 crowns, a third of the Borysław-Tustanowice oil-producing basin, likewise all the pipelines and four refineries in Galicia. Austrian financiers subscribed one-third of the output and the national and small German financiers of the first period of the influx also possessed one-third. The German capitalists also behaved loyally towards the national organisation of producers, and the acquisition of the Joint Stock Company "Olex" by the "Deutsche Erdöl Aktiengesellschaft" delivered the export into their hands, which up to that time had been carried on by them in the name of the refiners.

The participation of Polish and of foreign capital in the oil industry of Poland in 1921 is in the following proportions:—

French capital, 53.03 per cent.; Polish, 18.35 per cent.; Swiss, 10 per cent.; Austrian, 7.12 per cent.; English, 4.40 per cent.; Dutch, 4.32 per cent.; Hungarian, 1.18 per cent.; Italian, 0.70 per cent.; Belgian, 0.46 per cent.; Czech, 0.41 per cent.; German, 0.03 per cent.; total 100 per cent. Before the war foreign capital was put into the following enterprises:—*

ALLIED CAPITAL.

1. Galicyjskie Karpackie Towarzystwo Naftowe (Carpatho-Galician Oil Company) at Borysław formerly Bergheim and MacGravey. Capital invested, 18 million crowns, 50 per cent. English.

2. "Premier" Group (Premier, Austria, Triumpf, Carpathian). Capital, 30 million crowns, 50 per cent. English.

3. Joint Stock Company "Galicia" at Drohobycz. Capital, 12 million crowns, 25 per cent. English.

4. "Płynne materjały palne" (Inflammable liquids) firm at Borysław. Capital, 60 per cent. French.

5. Brugger Trieste refinery of mineral oils at Borysław. Capital, 50 per cent. Greek.

6. The José Maria Veter Keyn firm. Belgian capital.

7. Vacuum Oil Company. American capital.

8. The British Austria Group (Motor Investors' Association. Oil Land Owners' Union, Oil Investors' Association, Oil Industry Company). English capital.

9. The "Mougeota" Group (Société Française des Pétroles de Potok, Société des Pétroles de Wańkowa, the Dąbrówa Oil Company, the Franco-Carpathian Oil Company). French capital.

Besides these large enterprises the following firms are floated with French capital: Gabriel Lemercier at Borysław, Compagnie Internationale des Pétroles at Borysław, Victor Petit at Kobylanka, Orzeł Karpacki at Borysław, the "Union" Oil

* "Nafta Polska a kapitały zagraniczne" (Polish Oil and Foreign Capital), by G. Paczewski. Tydzien Polski, No. 3/4, 1921.

Industry Company at Borysław (Mines at Tustanowice and the refineries at "Siła and Światło" at Limanowa, the "Grabownica" Boring Company, the Tyśmienica Company at Borysław and many others.

English capital is in possession of the following firms: "Elgin, Scott & Co.," at Borysław, "Midland Popiele," at Popiele, Herbert Lloyd Chittenden at Węglówką, the "Joanna Oil Association at Drohobycz, Oil Association in Lwów, "Centrum" Company at Drohobycz, "Poland" Company in Lwów, E. T. Boxall at Rypne, "Ratoczyn" Company at Borysław, etc. Belgian capital is implicated in the mines at Ropienka, the owners of the firm being "Wiktor Goldschmidt," of Brussels, Dutch capital—in the "Zagórz" mines in Lwów, T. Haevecker at Bitków, etc.

Besides which, there is in the hands of the Allied financiers well-known oil basins of unexplored riches in which the process of boring has not yet been started.

GERMAN-AUSTRIAN CAPITAL.

German capital in Galician lands was represented by the Deutsche Erdöl-Aktien-Gesellschaft (German Petroleum Joint Stock Company), Hanowersko Galicyjskie Gwarectwo Naftowe at Krosno (capital, 5,000,000 crowns), Gwarectwo Starklowa (18,000,000 crowns), Bank für Napfta-Industrie (Bank for Petroleum Industry) (2,160,000 crowns), "Piaseczna" (formerly A. Compes), "Opaka," Laupenmühlen, and many others.

Of late years the proportion of foreign capital has changed to such an extent that French capital has attained almost 55 per cent., and probably amounted to about 600,000,000 francs; Polish capital is about 20 per cent., so that English, Belgian and, in a small degree, German and Austrian capital made up the rest. French capital is principally represented by three groups: Concern du Nord, at the head of which is the Banque de Paris et des Pays Bas, and the Société Franco-Polonaise, possessing 50,000,000 francs issued capital, and they propose increasing it to 200,000,000. Amongst the most important transactions of buying and selling we may quote the following:—

1. Société financière des Pétroles de Narklowa bought from L. Schulzman all his shares, together

with the shares in the shafts at Borysław and Tustanowice.

2. Akc. Tow. Galicja (Joint Stock Company of Galicia), together with the huge oil basins "Liebig" at Bitków and Opoka passed into the possession of the Polish-French Company.

At present the Polish-French company commands very valuable oil basins in Galicia. They border on the best oil-fields at Borysław. In East Galicia these basins embrace the oil-fields at Bitków and border on the Dzia fields at Bitków, where numerous borings have already been drilled. The above society undoubtedly exercises great influence over the oil industry of Galicia.

One of the last of the Society's transactions is the acquisition of refineries of the firm "Bracia Haber Joint Stock Company" at Stanisławów, situated near Bitków and Sotwina.

3. The Carpatho-Galician Oil Joint Stock Company, together with "Schodnica" was bought by the Banque de Paris et des Pays Bas and the firm Rẹnard Frères et Com.

4. Half the shares of the "Narklowa" Oil Company, which possesses mines at Narklowa (in the Jasło district) were acquired by a French consolidation with Mr. Auerbach at the head. Formerly these mines belonged exclusively to a group of German financiers.

5. The Concern du Nord acquired the petroleum refinery at Niegłowice (near Jasło) of Gardenberg and Schreier.

6. The "Mineralia" mining company near Krosno (Bronisław Rappaport) also passed into French possession.

7. The shares in "Concordia," "Republika," at Mroźna, and all the shares in the shafts at Borysław were acquired by the French Joint Stock Company "Limanowa."

8. The "Concern du Nord" groups, with Count Mongest of Like at the head, possesses four companies, viz., (*a*) 50 per cent. of the mines of Tłoka and Bukowice at Tustanowice in conjunction with the Carpatho-Galician Oil Company. (*b*) The Oil King Mines and Everes at Borysław, the famous mines of Wankowa, Brelików, Leszczowate, Polsk, Krościenko, the mines of the Hanoverian

"gwarectwo" at Polsk. Grube Kleczany, the gas-oil wells at Winnica, with pipelines leading to the refineries at Jedlicze and to Gruby Potok. Besides which, the "Concern du Nord" acquired the "Opiag" and "Gol" mines at Bitków, as well as the Jedlicze refineries.

9. The refineries near Zagórze, belonging to Count Skrzyński of Libuna, passed into the hands of the firm of Nobel Brothers.

10. Last of all, we may bear in mind the transactions executed by the "Premier Oil and Pipeline Cotto" Company. Before the war this company's shares were partly in the hands of the Germans (Deutsche Erdöl Joint Stock Company) and partly in the hands of English groups. At the time of the war (1915), the German group, to whom the English group were under obligations of debt, were obliged to liquidate the English shares.

After peace was signed the representatives of the English group presented their claims, but it was proved that, in the meantime, almost all its shares had passed into the hands of the Swiss Consolidated "Terra," who was protected by the Swiss Government.

The matter had to be decided by law in accordance with the Peace Treaty. The Polish Government saw itself compelled to give the estate of the "Premier" Company compulsory administration, which it did on September 29, 1920, in agreement with the English legation and with the direct initiative of those Englishmen interested in the matter with Mr. Perkins at the head.

In the meantime the news was spread that the shares sequestrated by the English Government were to be sold to the French Group with Mr. Auerbach at the head.

This rumour was contradicted by the "Premier" Company stating that those shares had been sold to the English Group whose representatives are taking an active part in the administration of the company. As regards Auerbach's Group—they remained in connection with the "Premier" Company and made an agreement which entitled them to acquire the whole of the company's property in Galicia. At the same time the French Group

bound themselves to create a new French company with a capital of 175,000,000 francs, of which the "Premier" Group was to receive a good share. The creation of that company, as the French Press tells us, was accomplished on October 15, 1920.

Besides the "Deutsche Erdöl (German Petroleum) Joint Stock Company and the "Austria" Joint Stock Company in Vienna, the new French company also comprises the following companies :—

Alfa Petroleum Company, Ltd.,
Alliance Petroleum Company, Ltd.,
Carpathian Petroleum Company, Ltd.,
Centrum Petroleum Company, Ltd.,
Premier Petroleum Company, Ltd.,
Petroleum Works of Galicia Company, Ltd.,
Triumf Petroleum Company, Ltd.,
Gracia Petroleum Company,

together with the pipelines belonging to the above named companies, as also refineries at Peczeniżyn, Drohobycz, Trzebinia and Mährisch-Lichtenberg. Therefore it is an incontestable fact that the oil industry is at present under the control of French and English capital, both strongly opposing the competition of the "Standard Oil" Company.

It is worthy of notice that of late years the "Royal Dutch" has taken an interest in the oil industry of Galicia, and has approached the Polish Government with the proposition of participation in the credit and placing all the necessary technical tools at its disposition.*

LIST OF REFINERIES IN POLAND.

(The annual capacity of refining crude oil is given in brackets, in tanks of 10 tons.)

1. State's factory of mineral oils in Drohobycz (26,000). 2. "Limanowa" Company in Limanowa (12,000). 3. Vacuum Oil Company in Dziedzice (12,000). 4. Galician Oil Company, "Galicia," in Drohobycz (8,000). 5. "Gartenberg & Schreier in Jasło (7,200). 6. "Carpatho-Galician Oil Company," formerly Bergheim & McGarvey in Glinik Marjampolski (7,000). 7. Company for oil industry, "Trzebinia," in Trzebinia (7,000). 8. Oil Company,

* See above-mentioned article in "Tydzien Polski," No. 4, 1921.

"Schodnica," in Dziedzice (6,000). 9. Drohobycz refinery of mineral oils, "Dros," in Drohobycz (5,000). 10. Oil Company, "Fanto," in Ustrzyki (3,600). 11. W. Stawiarski & Co., in Krosno (3,000). 12. Oil Company of "Dąbrowa," in Jedlicze (2,000). 13. "L. Wiśniewski & Co.," in Drohobycz (1,000). 14. "Company for oil industry of Nobel Brothers in Poland," in Libusza (1,000). 15. "Haber Brothers," in Stanisławów (1,000). 16. "The First Galician Company for oil industry, St. Szczepanowski & Co.," in Peczeniżyn (700). 17. M. H. Reich, in Stryj (600); besides 56 other small refineries in Little Poland of a joint capacity of 6,900.

The above list of refineries situated in Poland shows 17 large refineries with a capacity of 1,031,000 tons yearly, and 56 small refineries with a total refining capacity of 69,000 tons yearly, thus bringing the total actual capacity of all Polish refineries up to 1,100,000 tons yearly, a figure which can be easily increased to 1,400,000 tons.

LIST OF MINES OF CRUDE OIL IN POLAND.

JASŁO DISTRICT.

Besko.
Białobrzegi.
Bóbrka.
Brzezówka.
Czaszyn.
Dobrucowa.
Dominikowice.
Dukla.
Faliszówka.
Głęboka.
Głębokie.
Grabownica.
Grudna.
Harklowa.
Hołowiecko.
Humniska.
Iwonicz.
Jaszczew.
Klęczany.
Klimkówka.
Kobylanka.
Kobylany.
Krasna.
Krościenko Niżne.
Krościenko Wyżne.
Kryg.
Łazy.
Łęki.
Libusza.
Lipie.
Lipinki.
Lubatówka.
Męcinka.
Mokre.
Mrukowa.
Mrzygłód.
Odrzechowa.
Osobnica.
Pagorzyna.
Płowce.
Posada Górna.
Posada Wyżna.
Posadowa.
Potok.

Rogi.
Ropa.
Ropianka.
Równe.
Rudawka Rymanowska.
Rymanów.
Sanok.
Sękowa.
Siary.
Sokołowa Wola.
Starawieś.
Szymbark.
Tarnawa Dolna.
Tokarnia.
Toki.
Toroszówka.
Trzetrzewina.
Turzepole.
Węglówka.
Wielopole.
Wietrzno.
Winnica.
Wilżylów.
Wojtowa.
Wola Jaworowa.
Woltuszowa.
Wulka.
Zagórz.
Załawie.
Zasław.
Zawadka.
Zmiennica.

DROHOBYCZ DISTRICT.

Bandrów.
Borysław.
Brelików.
Dolina.
Duba.
Hoszów.
Huczko.
Kropiwnik.
Łodyna.
Moczar.
Mraźnica.
Nahujowice.
Opaka.
Orów.
Paszowa.
Perehińsko.
Polana.
Popiele.
Rajskie.
Ropienka.
Rosochy.
Rudawka od Starzawa.
Rypne.
Schodnica.
Sloboda Dubeńska.
Strzelbice.
Tustanowice.
Urycz.
Ustrzyki Dolne.
Wańkowa.

STANISŁAWÓW DISTRICT.

Bitków.
Dzwiniacz.
Kałusz.
Kosmacz.
Kryczka.
Maniawa.
Molotkow.
Pasieczna.
Pniów.
Sliwki.
Slobodo Rungurska.

The above list of the mines and oil wells includes only those districts or fields on which either exploitation or drilling is going on. In addition to this there are in Poland many districts in which crude oil was formerly produced at shallow levels, the wells after their exhaustion being discarded. Experts are of the opinion that many of these wells and districts could be exploited for deeper oil.

OIL STATISTICS.

TURNOVER OF ROCK OIL AND OIL PRODUCTS FOR 1920 IN THE WHOLE OF POLAND, BASED ON STATISTICS PUBLISHED BY THE STATE OIL DEPARTMENT.

(In Tons.)

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Stores of rock oil ..	59,934	60,134	57,665	51,671	56,759	54,604	54,418	54,692	55,816	55,120	52,450	—
Stores of oil products ..	11,001	11,545	13,330	14,979	16,161	18,357	18,577	19,169	19,948	21,217	16,659	20,369
Output of rock oil ..	6,384	6,045	6,850	6,511	6,633	6,175	6,622	6,713	6,318	6,197	5,771	5,879
Rock oil worked up ..	4,174	5,384	4,797	5,829	6,171	6,549	5,272	4,753	5,204	5,869	5,016	5,689
Dispatch of oil products in the country ..	2,383	2,303	2,259	1,578	2,092	1,946	2,591	2,181	2,295	2,046	1,625	1,957
Dispatch of oil products to foreign countries	1,529	1,545	1,680	1,609	1,471	1,546	1,430	1,359	1,408	1,263	1,632	2,108

Rock Oil Output, Waste, Stores and Amount Used as Fuel in 1919 and 1920.

Mining Administration.		Gross Output.	Used as Fuel	Waste.	Net Output.	Stores.
		In Tons.				
Drohobycz	1919	758,834	38,863	59,304	660,667	556,134
	1920	690,579	53,966	60,889	575,724	438,454
Jaslo	1919	51,726	4,070	539	47,117	12,228
	1920	49,216	5,247	605	43,464	18,097
Stanislawów	1919	21,143	581	375	20,187	5,420
	1920	24,923	357	349	24,217	7,838
Total ..	1919	831,703	43,514	60,218	727,971	573,782
	1920	764,818	59,570	61,843	643,405	464,389

Remark.—During the year 1920 a total of about 93,077 tons of rock oil was burnt in the mines and industrial establishments

Turnover in the Refineries for the Year 1920.

(In Q.M.)

Rock oil received : 7,106,731. Rock oil worked up : 6,687,650. Stores, January 1, 1921 : 557,454.

	Motor Spirit.	Petroleum.	Oil Gas.	Lubricating Oil.	Paraffin.	Refuse.	Total.
Output	769,027	1,788,765	993,032	898,601	214,179	1,417,743	6,082,247
Exports	223,289	583,457	368,017	361,167	93,362	378,042	2,007,334
Dispatched in the country	503,076	861,414	200,035	449,490	87,074	466,626	2,567,715
Stores on Jan. 1, 1921 ..	115,086	505,335	249,944	425,804	70,435	670,332	2,036,936
Relation of exports to output	29%	33%	37%	40%	44%	27%	33%
Relation of exports to products dispatched	31%	40%	65%	44%	52%	45%	44%
Consumed in the refineries	4,700	7,289					11,989

STATE OF THE SHAFTS, AND NUMBER OF WORKMEN EMPLOYED IN THE OIL INDUSTRY IN GALICIA IN THE MONTH OF DECEMBER, 1920.

Mining Districts.	In Course of Boring.	In Course of Equipment.	Worked by Suction. Pump.	Worked by Scooping.	Worked by Pump.	Self-flowing.	Gaseous Oil.	In Course of Erection.	Stationary.	Total.	Workmen Employed.
Jasło	63	6	22	7	735	1	7	15	—	856	2,982
Drohobycz ..	153	49	159	—	694	7	76	33	—	1,171	7,461
Stanisławów ..	5	2	6	—	71	18	—	3	80	185	1,042
Total ..	221	57	187	7	1,500	26	83	51	80	2,212	11,485

OIL PRODUCTS EXPORTED DURING 1920, WITH COUNTRIES OF DESTINATION.
(In Q.M.).

	Motor Spirit.	Petroleum.	Gas Oil.	Lubricating Oils.	Paraffin.	Residue.	Total.
German Austria	124,291	177,022	168,050	180,231	50,187	141,396	841,177
Germany	39,966	161,830	88,044	48,281	13,333	149,225	491,679
Czecho-Slovakia	34,965	118,582	58,046	94,128	17,423	62,909	386,053
Jugoslavia	8,146	34,393	7,427	25,346	2,394	18,263	95,963
Switzerland	7,913	18,781	12,817	154	400	4,016	44,081
Hungary	1,880	7,893	9,883	2,245	3,706	1,002	26,809
Sweden	502	2,109	—	2,911	1,311	401	7,234
Danzig	66,885	57,923	40,828	1,079	800	—	107,515
Italy	4,461	9,003	2,248	3,738	2,100	—	21,550
Denmark	—	—	2,597	—	—	—	2,597
Roumania	—	—	—	—	1,070	—	1,070
Silesia	201	751	—	—	—	—	952
Warmia	105	505	—	—	200	—	810
Ukraina	—	606	—	—	—	—	606
Finland	—	—	—	371	15	20	406
Pomerania	—	—	—	—	100	—	100
Various	2,479	1,658	1,349	201	300	—	5,987
Total	222,788	591,056	391,289	358,685	93,339	377,232	2,034,389

Stores of Oil Products and Rock Oil at the Refineries in December, 1919, January, 1920, and June, 1920.

(In Q.M.)

	Rock Oil.	Motor Spirit.	Petroleum.	Gas Oil.	Lubricating Oils.	Paraffin.	Residue.	Total.
December, 1919	221,314	77,142	285,439	83,480	352,626	50,962	413,724	1,263,373
January, 1920	366,943	71,233	258,513	66,257	327,008	45,537	341,557	1,110,105
June, 1920	769,524	121,033	548,543	124,489	355,279	64,647	621,753	1,835,744
January, 1921	557,454	115,086	505,335	249,944	425,804	70,435	670,332	2,594,390

Output of Oil-Gas for January, 1921.

Mining Districts.	Total number of boreholes (being drilled, equipped or pumped).	Number of boreholes producing gas.			Average output of gas per minute in m³.	Average output of gas per borehole in m³.		Number of boreholes producing gas.			
		In operation.	Stationary.	Total.		On total number of boreholes inoperation	On number of producing boreholes.	Below. Average amount.	Above. Average amount.	Above. Double average amount.	Total.
Borysław ..	168	58	32	90	255.55	1,521	2,838	57	23	10	90
Tustanowice	140	84	40	124	199.45	1,424	1,608	92	22	10	124
Mraźnica ..	52	10	—	10	64.15	1,223	6,415	3	5	2	10
Popiele ..	1	—	—	—	—	—	—	—	—	—	—
Total ..	361	152	72	224	519.15	1,438	2,318	152	50	22	224

Remark.—The boreholes producing the most gas are :—

In Tustanowice	..	Buskowice XXVI	..	12.10 m³.	In Borysław	.. Nafta XXX	.. 22.70 m³.
In „	..	Marg. Grace X	..	10.85 m³.	In „	.. Blochówka II	.. 10.95 m³.
In „	..	Tadeusz I	.. ..	9.30 m³.	In Mraźnica	.. Zofja II	.. .. 14.95 m³.
In Borysław	..	Pilsudski	.. ..	33.15 m³.	In „	.. Zofja I	.. .. 10.00 m³.

Turnover of Rock Oil and Oil Products in Poland in 1919 and 1920 (in wagons of 10,000 kg.).

I. Rock Oil.

(1) Output in 1919	83,170
(2) Stores on January 31, 1920	51,909
„ December 31, 1920	34,941
(3) Amount in refineries on December 31, 1919 ..	5,499
„ „ „ „ 1920 ..	5,574
(4) Worked up in refineries during second half of 1919	23,558
Worked up in refineries during the year 1920	66,877
(5) Amount freed for fuel, etc., in interior of country	3,800
(6) Exports in 1920	3,740

Stores of Rock Oil in the Warehouses and at the Mines on January 1, 1921.

(In Cistern Kilogrammes.)

Districts.	In Warehouses.	At the Mines.
Drohobycz mining district	41429.5719	2416.8252
Jaslo mining district ..	—	783.8255
Stanisławów mining district	—	1343.5244

Remark.—No data are at present available for the stores in the Jaslo district warehouses. As to the Stanisławów district, no figures are given for the warehouses because the only storage company, "Dąbrowa," have their stores at the mines.

II. Oil Products.

	Second Half of 1919.					
	Motor Spirit.		Fuel Products.	Other Products (Naphtha, Gaseous Oil, Lubricating Oils, Paraffin).	Total.	
(1) Output	3,656		4,997	14,997	23,650	
(2) Exports	1,260		1,201	3,848	6,309	
(3) Consumed in the country ..	2,114	2,557	2,024	8,717	12,855	17,723
Consumed in the refineries ..	443		970	2,994	3,455	12,172	4,868	

Oil Output in Galicia in 1920.

(In Cistern Kilogrammes.)

	February, 1921.	
Drohobycz District—		
Rosochy	1.9720	—
Tustanowice	24541.4865	1663.9992
Borysław	27058.8100	1741.4018
Mraźnica I.	10955.6222	828.6966
„ II.	73.2384	5.6354
Schodnica	2294.2383	182.9730
Uryez	1049.9984	86.6300
Opaka	91.1750	7.4900
Rypne	761.4711	57.9070
Ropienka	259.1569	17.7963
Wańkowa	1682.4345	109.4540
Paszowa	47.0449	4.6379
Sloboda Dubieńska ..	37.6910	2.8630
Strzelbice	164.9200	11.4600
Ustrzyki-Lodyna ..	17.5800	—
Rajskie	6.6141	2.6490
Polana	0.6615	—
Duba	1.1500	—
Topiele	11.6967	—
Kropiwnik	0.9927	—
Total ..	69057.9042	4725.2732*
Jaslo District—		
Besko	1.2000	5.700
Białobrzegi	0.2700	—
Bóbrka	168.8051	13.5340
Dominikowice	28.4950	2.0250
Grabownica Starz. ..	155.5431	15.4570
Harklowa	339.5190	25.9220
Humniska	89.2360	5.3270
Iwonicz	66.3100	8.7250
Klęczany	14.1889	0.9600
Klimkówka	269.5550	19.5450
Kobylanka	145.4901	11.7650
Kobylany	25.5405	1.8290
Korczyna-Biecz	29.6044	4.2000
Krościenko Niżne ..	472.6750	39.6183
Krościenko Wyżne ..	55.3385	7.9484
Krosno	23.8137	5.1700
Kryg	75.2267	5.7810
Libusza	155.7700	14.0450
Lipinki	334.3540	28.7130
Leki	9.6545	0.6000
Mokre	7.9412	0.7060
Mrukowa	0.7542	0.500
Pagorzyna	10.6170	1.7500

* Of this 596.0880 cist. kg. were used as fuel in the mines; waste oil amounted to 418.5738 cist. kg., so that the net output amounted to 3710.6114 cist. kg.

		February, 1921.
Posadowa	2.4540	0.3000
Posada Górna	1.3100	—
Potok	884.4801	62.2696
Rogi	142.6095	11.4000
Ropienka	8.6100	3.0000
Równe	385.5459	—
Rudawka Rym.	6.6646	2.200
Sękowa	15.6500	0.750
Stara Wieś	4.2230	4.600
Szymbark	64.1950	5.5200
Tokarnia	12.0800	—
Toroszówka	3.6000	0.3000
Turzepole	106.3699	8.5850
Węglówka	481.3630	35.3086
Wielopole	5.9350	—
Wietrzno	48.9916	3.2204
Wojtowa	9.5150	0.7190
Wola Jaworowa	5.6870	—
Wulka	140.1086	11.6690
Zagórz	57.8667	5.2700
Zmiennica	67.0511	6.9960
Ropica Ruska	2.6336	0.5400
Total ..	4931.6473	*396.9008
		March, 1921.
Stanisławów District—		
Bitków	2146.4184	173.0822
Pasieczna	27.8988	3.4198
Pniów	14.1044	—
Słoboda Rungurska ..	241.4180	21.1900
Kosmacz	62.4297	3.4400
Total ..	2492.2093	†201.1320
Grand Total ..	76418.8208	

* Of this 65.2644 cist. kg. were used as fuel in the mines, waste oil amounted to 6.4477 cist. kg., so that the net output amounted to 325.1887 cist. kg.

† Of this 3.6360 cist. kg. were used as fuel in the mines; waste oil amounted to .2500 cist. kg., so that the net output amounted to 197.2460 cist. kg.

Dispatch of Oil Products to Poland and Abroad in 1920.

(Quantities in Metric Quintals.)

Refineries.	Motor Spirit.		Petroleum.		Gas Oil.		Lubricating Oil.		Paraffin Wax.		Residues.		Total.	
	Poland.	Abroad.	Poland.	Abroad.	Poland.	Abroad.	Poland.	Abroad.	Poland.	Abroad.	Poland.	Abroad.	Poland.	Abroad.
Vacuum	14,165	9,846	5,800	34,433	7,157	19,796	34,081	31,874	4,893	9,295	3,384	2,961	69,480	108,205
Schodnica	19,292	12,860	27,934	28,275	16,127	40,450	30,860	41,679	7,287	9,522	3,360	4,036	104,860	136,822
Karpaty	33,050	14,564	56,804	50,159	17,106	31,157	34,377	37,282	7,984	5,622	8,427	8,976	157,748	147,760
Jasło	17,367	7,650	41,895	23,822	7,410	14,264	29,438	39,923	2,876	8,172	1,579	5,174	100,565	99,005
Jedlicze	21,270	7,873	27,451	15,278	4,673	18,058	23,350	16,406	759	1,702	1,278	1,636	78,781	60,953
Krosno	7,964	2,858	32,321	9,613	9,591	4,073	27,338	7,422	1,444	1,663	9,447	1,500	88.105	27,129
Limanowa	46,606	23,894	104,888	40,898	7,813	31,944	48,992	29,940	12,949	8,399	1,698	4,778	222,946	139,853
Libusza	25,150	2,358	14,210	10,949	1,666	200	18,740	223	—	—	7,360	11,996	67,126	25,726
Trzebinja	31,225	15,450	44,669	41,962	6,260	22,442	39,026,	35,976	9,813	13,950	5,607	2,842	136,600	132,622
Ustrzyki	8,621	6,388	25,985	14,523	2,086	13,039	5,429	16,337	1,006	4,076	11,845	14,528	54,972	68,891
Dros	28,765	3,366	69,112	32,326	12,207	1,252	18,795	7,741	10,360	3,972	1,341	—	140,580	48,657
Galicja..	53,884	39,804	135,158	86,346	24,066	51,827	63,254	51,280	14,019	15,874	9,493	7,572	299,874	252,703
Wiśniewski	17,623	3,989	7,515	5,888	11,441	4,574	29,810	1,515	1,940	200	2,127	—	70,456	16,166
Polmin	144,546	69,336	231,174	180,645	69,370	111,030	28,580	40,854	11,369	10,915	383,619	311,613	868,658	724,393
Bracia Haber	11,096	—	19,505	2,664	729	—	4,822	—	106	—	—	—	36,258	2,664
Szapiro and Fenert	—	—	60	—	72	—	—	—	—	—	—	—	131	—
Lieberman	1,048	—	1,189	319	146	—	4,475	2,618	—	—	583	306	7.441	3,243
Gleicher	438	—	574	—	—	—	122	11	—	—	26	24	1,160	35
Griffel Stanisławów	8,325	1,552	7,815	2,768	1,420	3,911	3,336	86	—	—	407	—	21,303	8,317
Nadwórna	347	—	7	—	—	—	—	—	—	—	137	—	491	—
Peczeniżyn	8,862	1,401	5,941	2,389	556	—	1,478	—	269	—	10,734	—	27,840	3,790
Gasolina	392	—	788	—	30	—	—	—	—	—	1,669	—	2,879	—
Dereżyce	809	—	319	—	—	—	457	—	—	—	1,646	—	3,231	—
Backenroth	112	—	—	—	9	—	114	—	—	—	—	—	235	—
Hoffman and Ob	14	100	—	200	—	—	475	—	—	—	90	100	579	400
Gartenberg and Sp	—	—	—	—	100	—	1,201	—	—	—	723	—	2,024	—
Polska nafta w Kołomeji .. (Polish oil at Kołomeja)	563	—	300	—	—	—	283	—	—	—	46	—	1,192	—
Polska nafta w Drohobyczu..	1,542	—	—	—	—	—	657	—	—	—	—	—	2,199	—
Total ..	503,076	223,289	861,414	583,457	200,035	368,017	449,490	361,167	87,074	93,362	466,626	378,042	2,567,715	2,007,334

OUTPUT OF OIL PRODUCTS IN THE YEAR 1920. (Quantities in Metric Quintals.)

Refineries.	Motor Spirit.	Petroleum.	Gas Oil.	Lubricating Oil.	Paraffin Wax.	Residues.	Total.
Polmin	201,051	456,361	221,746	93,888	24,236	801,644	1,798,926
Limanowa	77,512	183,439	138,671	129,919	33,225	143,324	706,090
Galicia	88,110	268,051	132,643	118,996	32,106	9,982	649,888
Karpaty	47,146	139,974	53,536	66,549	16,995	128,723	452,923
Trzebinia	46,867	124,702	121,549	73,499	11,710	20,043	398,370
Schodnica	44,080	110,462	59,601	68,037	30,301	30,049	342,530
Vacuum	46,640	95,978	46,305	59,353	16,590	37,305	302,171
Dros	32,312	75,144	61,872	42,601	14,836	29,766	256,531
Jasło	31,199	82,382	46,707	80,647	16,431	16,281	273,647
Ustrzyki	16,047	39,713	39,538	20,308	4,334	78,752	189,692
Jedlicze	32,968	58,823	21,319	30,821	2,594	17,491	159,016
Krosno	11,886	46,676	12,118	32,570	6,004	24,933	134,188
Libusza	26,527	42,427	14,654	16,024	—	41,701	141,333
Wiśnienski	20,585	18,255	15,915	30,573	1,900	1,900	89,128
Bracia Haber	13,217	13,391	1,315	9,630	1,076	117	38,746
Peczeniżyn	12,298	11,832	1,998	2,239	1,841	15,012	45,220
Griffel Mykiet	13,293	15,390	9,225	3.577	—	1,425	42,910
Liebermann	1,374	3,216	130	8,204	—	2,395	15,319
Gartenberg	—	—	290	2,056	—	5,552	7,898
Deresyen	921	902	253	2,985	—	2,874	7,935
Polska nafta w Drohobyczu (Polish Oil at Drohobycz)	1,738	1,485	270	1,624	—	740	5,857
Polska nafta w Kołomeji	673	984	1,287	791	—	224	3,959
Backenroth	504	931	411	207	—	999	3,052
Hubicze Gasol.	663	878	594	—	—	3,154	5,289
Hoffman and Ol.	303	546	180	970	—	669	2,668
Gleicher	400	786	639	133	—	1,028	2,986
Szulzmann	240	867	105	—	—	1,223	2,435
Szapiro and Fenert	—	126	60	—	—	—	186
Griffel, Nadwórna	373	9	—	—	—	137	519
Griffel, Pasieczna	100	15	—	—	—	—	115
Hubicze Rappaport	—	20	—	2,400	—	300	2,720
Total ..	769,027	1,788,765	993,932	898,601	214,179	1,417,743	6,082,247

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